

Employment

Overview

Differences in participation of women, minorities, and persons with disabilities in science and engineering employment are rooted in differences in their current and historic participation in science and engineering education. As previous chapters show, the proportions of S&E degrees earned by women and minorities have increased over time. Because the S&E labor force is comprised of people who received their degrees from about the 1940s to the present and because women and minorities were a smaller percentage of earlier years' degree recipients, women and minorities are a smaller percentage of the labor force as a whole than they are of current degree recipients.

Trends in S&E employment, 1993–99

Previous chapters discussed the various populations that feed into the labor force.¹ This section highlights the growth, by demographic group, of working scientists and engineers.² The number of employed people in the United States with either S&E degrees or S&E occupations grew from 9.8 million to 11.0 million from 1993 to 1999. The number of those who are employed in S&E occupations has grown from 3.3 to 3.5 million over that time period.³ (See appendix table 6-1.)

¹Much of the data in this chapter come from the National Science Foundation's Scientists and Engineers Statistical Data System (SESTAT) surveys. (See appendix A for a description of the SESTAT population and information relating to standard errors of the estimates from these surveys.) Because changes were made in these surveys over time to improve data quality and survey coverage, trend data before the surveys of the 1990s on S&E employment are not available; comparisons can be made, however, between 1993 and 1999.

²The definition of "scientists and engineers" used in SESTAT includes all persons who have ever received a bachelor's degree or higher in an S&E field, plus persons holding a non-S&E bachelor's or higher degree who were employed in an S&E occupation at the time they first were surveyed in the 1990s.

³Because after 1993 the SESTAT surveys identify individuals for inclusion at the point of earning a science or engineering degree from a U.S. institution, two subpopulations of scientists and engineers in the United States are underrepresented in the SESTAT integrated database in subsequent survey years: (1) new immigrants with S&E degrees earned outside the United States who entered the U.S. labor force after 1990, and (2) people with no S&E degrees working in S&E occupations after 1990. See appendix A for more information on undercoverage in the SESTAT surveys.

Women

Women constituted 35 percent of employed people with either an S&E degree or in an S&E occupation and 24 percent of those employed in an S&E occupation in 1999. (See appendix table 6-1.) Roughly the same proportion of women were employed in S&E in 1999 as in 1993. Further, women accounted for approximately the same percentages of physical scientists, life scientists, social scientists, and engineers in 1993 and 1999. They comprised a slightly smaller percentage of computer and mathematical scientists in 1999 than in 1993.

Minorities

Asians, blacks, Hispanics, and American Indians combined were 17 percent of employed persons with either S&E degrees or S&E occupations and 18 percent of those in S&E occupations in the United States in 1999.⁴ Asians made up 11 percent, blacks and Hispanics were each about 3 percent, and American Indians were less than 0.5 percent of those in S&E occupations in 1999. (See appendix table 6-1.) The percentage distribution of employed scientists and engineers by race/ethnicity changed little between 1993 and 1999, with the exception of a slight increase in the proportion that is Asian and a slight decrease in the proportion that is white.

Minority women

Seven percent of employed people with either an S&E degree or in an S&E occupation and 5 percent of those employed in an S&E occupation in 1999 were minority women. (See appendix table 6-2.) More specifically, Asian women were 3 percent, black and Hispanic women were each 1 percent, and American Indian women were 0.1 percent of those employed in S&E occupations. Within every racial/ethnic group, women accounted for a smaller percentage of total scientists and engineers than did men.

⁴The racial/ethnic data presented in this chapter are not restricted to U.S. citizens and permanent residents but also include persons on temporary visas. Such people represent only a small proportion of employed scientists and engineers (less than 2 percent).

Persons with disabilities

People with disabilities accounted for 7 percent of employed people with either an S&E degree or in an S&E occupation and 6 percent of those employed in an S&E occupation in 1999; these were about the same percentages as in 1993. (See appendix table 6-3.)

Measuring Disabilities for People in the Labor Force

The National Science Foundation's (NSF's) SESTAT surveys use a functional definition of disability patterned after one developed by the U.S. Bureau of the Census. The survey questions ask individuals, "What is the USUAL degree of difficulty you have with [specific tasks involving seeing, hearing, walking, and lifting]?" (The full wording of these alternatives in the survey forms is "SEEING words or letters in ordinary newsprint [with glasses/contact lenses if you usually wear them]," "HEARING what is normally said in conversation with another person [with hearing aid, if you usually wear one]," "WALKING without assistance [human or mechanical] or using stairs," "LIFTING or carrying something as heavy as 10 pounds, such as a bag of groceries.") Respondents are given five choices for each item: "none," "slight," "moderate," "severe," and "unable to do." Unless elsewhere noted, individuals in these surveys are classified as having a disability if they have at least moderate difficulty in performing one or more of these tasks.

Although this definition was designed to provide a relatively objective measure of disability, it is important to note that it does not capture all disabilities. For example, learning disabilities, behavioral disorders, and speech impairment are not included in the surveys.

Labor force participation, employment, and unemployment

Women

Women with either an S&E degree or in an S&E occupation are less likely than men to be in the labor force (that is, either employed or seeking employment). Among those in the labor force, women are more likely than men to be unemployed:⁵ 2.0 percent of women and 1.6 percent of men were unemployed in 1999. (See text table 6-1.)

⁵ The unemployment rate is the ratio of those who are not employed and seeking employment to the total labor force. Those who are not in the labor force are excluded from the denominator.

Text table 6-1

Labor force participation and unemployment rates of scientists and engineers, by sex, race/ethnicity, and disability status: 1999

Sex, race/ethnicity, and disability status	Labor force participation rate ^a	Unemployment rate ^b
Total.....	85.6	1.7
Male.....	87.8	1.6
Female.....	81.9	2.0
White, non-Hispanic.....	84.9	1.7
Asian/Pacific Islander.....	89.4	2.0
Black, non-Hispanic.....	90.0	2.1
Hispanic.....	90.0	2.6
American Indian/Alaskan Native.....	81.7	2.9
Without disabilities.....	87.1	1.6
With disabilities.....	69.7	3.5

^aThe labor force participation rate is the ratio of those who are either employed or not employed and seeking employment to all scientists and engineers.

^bThe unemployment rate is the ratio of those who are not employed and seeking employment to the total labor force. Those who are not in the labor force are excluded from the denominator.

NOTE: "Scientists and engineers" include all people holding a bachelor's degree or higher in an S&E field plus people holding a non-S&E bachelor's degree or higher who were employed in an S&E occupation in 1993.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

Women's unemployment rates were higher than those for men within most major age groupings. (See appendix table 6-4.)

Reasons for not working (whether not in the labor force or unemployed) differ in some respects by sex. Women were more likely than men to cite family responsibilities (36 versus 3 percent), and men were more likely than women to cite retirement (74 versus 29 percent). (See appendix table 6-5.) These differences reflect variations in the age distributions of men and women as well as differing expectations as to who assumes family responsibilities.⁶

A higher percentage of women than of men with either an S&E degree or in an S&E occupation are employed part time. Of those who were employed in 1999, 19 percent of women and 6 percent of men were employed part time. (See appendix table 6-4.) Women who are employed part time are less likely than men to prefer full-time employment. (See appendix table 6-6.) Also, women who are employed part time are far more likely than men to cite family responsibilities as the reason for their employment status: 48 percent of the women working part time and 12 percent

⁶ See NSF (1996), p. 66, for a discussion of the relationship between unemployment and part-time employment and the presence of children under the age of 18.

of the men cited family responsibilities as the reason for their work status in 1999. On the other hand, 41 percent of men and 8 percent of women cited retirement as the reason for part-time employment. Thus, as with unemployment, variations in male/female age distribution, as well as varying family responsibilities, are factors in part-time employment choices.

Minorities

Asians, blacks, and Hispanics with either an S&E degree or in an S&E occupation are more likely than whites to be in the labor force (i.e., employed or looking for employment). Between 89 and 90 percent of Asians, blacks, and Hispanics with either an S&E degree or in an S&E occupation were in the labor force in 1999, compared with 85 percent of whites. (See text table 6-1.)

Although nonwhite scientists and engineers are less likely to be out of the labor force than whites, among those who are in the labor force, nonwhite scientists and engineers from some racial/ethnic groups are more likely to be unemployed. In 1999, the unemployment rate of white scientists and engineers was lower than that of Hispanics and Asians. (See text table 6-1.)

Age accounts for some of these differences in labor force participation. Asian, black, Hispanic, and American Indian scientists and engineers are younger than white scientists and engineers: 37 percent of white scientists and engineers were 50 or older in 1999, compared with 26 percent of Asians, 32 percent of blacks, and 21 percent of Hispanics.

Persons with disabilities

The labor force participation rates of scientists and engineers with and without disabilities are quite different. Thirty percent of persons with disabilities in the population of scientists and engineers were out of the labor force, compared with 13 percent of those without disabilities. (See text table 6-1.) Age accounts for some, but not all, of these differences in labor force participation. Those with disabilities are older than those without: 64 percent of those with disabilities were 50 or older in 1999, compared with 33 percent of those without disabilities. Older scientists and engineers are likely to be out of the labor force because of retirement. (See appendix table 6-4.)

Chronic illness or permanent disability can be another factor accounting for some of the tendency for persons with disabilities to be out of the labor force.⁷ Both persons with and without disabilities cited retirement as their primary reason for not working (70 and 51 percent, respectively);

⁷ Age at onset of disability is another important consideration. About half of all scientists and engineers with disabilities became disabled after age 30. Those who were disabled since birth may face different challenges entering the labor force or advancing in their careers than those who became disabled later in life. More research is needed on this topic (NSF/SRS 2000).

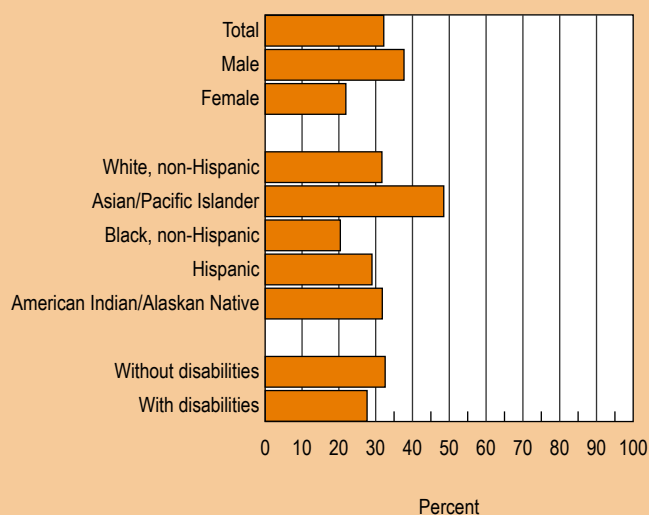
26 percent of people with disabilities and 3 percent of those without cited the category “chronic illness or permanent disability” as their reason. (See appendix table 6-5.)

Among those in the labor force, persons with disabilities are more likely than those without to be unemployed. The 1999 unemployment rate for scientists and engineers with disabilities was 3.5 percent, compared with 1.6 percent for those without disabilities. (See text table 6-1.)

Occupations of scientists and engineers

About one-third of employed people identified as scientists and engineers in the SESTAT surveys work in an S&E occupation. (See appendix table 6-1 and figure 6-1.) Many of those who are not employed in science and engineering occupations are employed in occupations within the S&E enterprise, such as management, health-related occupations, and sales and marketing. Throughout the remainder of this chapter, scientists and engineers are defined in terms of occupation, not degree field, unless otherwise noted.⁸

Figure 6-1
Percentage of employed scientists and engineers in S&E occupations, by sex, race/ethnicity, and disability status: 1999



NOTE: “Scientists and engineers” include all people holding a bachelor’s degree or higher in an S&E field plus people holding a non-S&E bachelor’s degree or higher who were employed in an S&E occupation in 1993.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

⁸ See appendix A for the SESTAT classification of S&E and non-S&E occupations.

Educational Field Versus Occupational Category

In many analyses of human resources for science and technology, there are two principal ways in which the data are presented: by educational field or by occupational category. Many times, these two separate concepts and the terminology to describe them are used interchangeably. For example, individuals with engineering degrees as well as individuals in the engineering profession can be referred to as “engineers.” This all-encompassing nomenclature leads to confusion and a lack of precision, because, in fact, not all individuals with engineering degrees work in an engineering occupation and not all individuals who work in an engineering occupation have an engineering degree.

In the present analysis, *educational field* refers to the specific degree that an individual holds. However, an individual may hold multiple degrees. This consideration particularly applies among the population of scientists and engineers, of whom almost 40 percent hold more than one degree, often in more than one field. In the analyses in this chapter, educational field data refer to an individual’s highest degree level (doctorate, first-professional, master’s, or bachelor’s) and/or field. Occupation data generally refer to the principal job an individual holds. Although people in the labor force may hold more than one job, in the analyses presented here, the focus is on what the respondent chooses to report as his or her *principal* job.

Women

As with degree fields (see chapters 3 and 5), women and men differ in S&E occupation, with women constituting higher percentages of some S&E occupations than of others. For example, in 1999 more than half of all psychologists (64 percent) and sociologists/anthropologists (52 percent) were women, compared with about 10 percent of physicists/astronomers and engineers. (See appendix table 6-7.) Women also constitute higher percentages of some engineering occupations than others; for example, 16 percent of chemical engineers in 1999 were women, compared with about 6 percent of electrical and mechanical engineers.

Minorities

Asians, blacks, and American Indians account for larger percentages of some S&E occupations than of others. (See appendix table 6-8.) In 1999, Asians made up a larger percentage of biological scientists (accounting for 15 percent

Scientists and Engineers Who Hold Second Jobs

In 1997, 12 percent of employed U.S. scientists and engineers (defined by degree or occupation) held second jobs (NSF/SRS 2001). Although the percentage of scientists and engineers with second jobs was relatively stable during the mid-1990s, there are notable differences in the demographic characteristics of those people who held second jobs.

Women were slightly more likely than men to hold second jobs (about a 1 percentage point difference). The percentages of women employed in second jobs were slightly higher than those of men for all degree levels. (See text table 6-2.)

Among racial/ethnic groups, 12 percent of Hispanics, 14 percent of American Indians, and 15 percent of blacks held second jobs, compared to 8 percent of Asians and 12 percent of whites. Blacks and American Indians were slightly more likely than members of other racial/ethnic groups to hold second jobs at all degree levels.

Scientists and engineers with disabilities were slightly more likely to have second jobs (13 percent) than those without disabilities (11 percent). For all degree levels, persons with disabilities were more likely than those without to have a second job.

of total), electrical engineers (15 percent), computer scientists (14 percent), and chemists (13 percent) than of other occupations (e.g., they were only 4 percent of the social scientists, including psychologists). Blacks accounted for a higher percentage of mathematical scientists (6 percent) and social scientists (5 percent) than of other occupations; for example, they comprised only 2 percent of the biological scientists and 1 percent of earth scientists/geologists/oceanographers. Hispanics were more proportionally distributed among occupations, accounting for roughly 2 to 4 percent in most S&E occupations.

Minority women

The occupational distributions of minority women among S&E occupations generally resemble that of white women. Within each racial/ethnic group, higher percentages of female scientists and engineers than of male are biological scientists and psychologists, and lower percentages are engineers. About 40 to 50 percent of male scientists and engineers in each racial/ethnic group were engineers in 1999, compared with less than 20 percent of their female

Text table 6-2

Likelihood of employed scientists and engineers holding a second job, by sex, race/ethnicity, disability status, and highest degree: 1997

Sex, race/ethnicity, and disability status	Total ^a	Highest degree level		
		Bachelor's	Master's	Doctorate
	Percent employed in a second job			
Total.....	11.5	10.5	12.4	15.1
Male.....	11.2	10.0	12.0	14.4
Female.....	12.1	11.4	13.1	17.3
White, non-Hispanic.....	11.5	10.3	12.6	16.0
Asian/Pacific Islander.....	7.8	7.9	7.1	8.3
Black, non-Hispanic.....	15.2	13.9	17.8	19.0
Hispanic.....	12.3	11.9	12.5	14.9
American Indian/ Alaskan Native.....	14.1	12.9	15.9	23.3
Without disabilities.....	11.4	10.4	12.3	15.0
With disabilities.....	13.0	11.9	14.1	17.2

^aIncludes first-professional degrees, which are not broken out separately.

NOTE: "Scientists and engineers" include all people holding a bachelor's degree or higher in an S&E field plus people holding a non-S&E bachelor's degree or higher who were employed in an S&E occupation in 1993.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

Asian S&E Doctoral Recipients

Among S&E doctoral recipients, Asians differ from members of other racial/ethnic groups in that they are overwhelmingly foreign-born. Foreign-born Asians account for 93 percent of the Asian S&E doctoral recipients in the United States; in contrast, approximately 12 percent of non-Asian S&E doctoral recipients in the United States are foreign-born. More than half (53 percent) of all Asian S&E doctoral recipients were born in the People's Republic of China, Taiwan, or Hong Kong. Another 24 percent were born in India, and 4 percent were born in Korea.

The occupational distribution of Asian S&E doctoral recipients is quite different from that of other racial/ethnic groups. Whether U.S.- or foreign-born, Asians are more likely than members of other racial/ethnic groups to be engineers, and they are less likely to be social scientists. For example in 1999, among U.S.-born S&E doctoral recipients, 19 percent of Asians were social scientists, compared to between 30 and 52 percent of members of other racial/ethnic groups. (See text table 6-3.)

Text table 6-3

S&E doctoral recipients employed in an S&E occupation, by birthplace, race/ethnicity, and occupation: 1999

Birthplace and race/ethnicity	Number	Percent distribution					
		Total	Computer and mathematical scientists	Life and related scientists	Physical and related scientists	Social and related scientists	Engineers
All U.S.-born.....	314,722	100	11	26	19	31	14
White, non-Hispanic.....	297,105	100	11	26	19	30	14
Asian/Pacific Islander.....	4,821	100	12	36	16	19	18
Black, non-Hispanic.....	5,494	100	7	20	12	52	9
Hispanic.....	5,833	100	10	25	15	39	11
All non-U.S.-born.....	102,014	100	19	21	17	14	30
White, non-Hispanic.....	33,709	100	16	20	17	22	26
Asian/Pacific Islander.....	59,896	100	21	22	17	7	34
Black, non-Hispanic.....	3,161	100	13	23	15	27	22
Hispanic.....	5,124	100	15	27	16	24	19

NOTES: Details may not add to totals because of rounding. Total includes American Indian/Alaskan Native and "other" race/ethnicity not shown separately.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Survey of Doctorate Recipients.

Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

counterparts. Asian women differ from women in other racial/ethnic groups in that a relatively small proportion (2 percent in 1999) were psychologists, compared to between 11 and 17 percent of women in other racial/ethnic groups. (See appendix table 6-2.)

Persons with disabilities

Scientists and engineers with and without disabilities do not differ greatly by S&E occupation: 10 percent of the members of both groups in S&E occupations were life scientists, 8 percent of both were physical scientists, 10 percent of both were social scientists, and 39 percent of both were engineers in 1999. (See appendix table 6-9.) Similar proportions of scientists and engineers with and without disabilities were computer scientists (28 versus 30 percent).

Sector of employment

Women

Among all those employed in S&E occupations in 1999, women were less likely than men to be employed in the private for-profit sector—49 versus 65 percent—and more likely to be employed in 4-year colleges or universities—21 versus 12 percent. These variations by sector primarily stem from differences in occupation. Women are less likely than men to be engineers or physical scientists, which are occupations that tend to be in business or industry. Within occupations, the percentages of men and women employed in industry and in 4-year colleges or universities are more similar. (See appendix table 6-10.)

Minorities

Asians are more likely than members of other racial/ethnic groups to be employed in business or industry. Among those in S&E occupations in 1999, 68 percent of Asians, compared with between 55 and 61 percent of whites, blacks, Hispanics, and American Indians, were employed in the private for-profit sector. (See appendix table 6-10.) Asians are also more likely than members of other racial/ethnic groups to be engineers, an occupational group likely to be employed in business or industry. Between 14 and 15 percent of employed scientists and engineers within each racial/ethnic group were employed in 4-year colleges or universities in 1999.

Persons with disabilities

People employed in S&E occupations with disabilities are about as likely as those without to be employed in for-profit business or industry: 62 versus 57 percent in 1999. They are also as likely to be employed in academia as their

counterparts without disabilities: 14 percent of both groups were employed in 4-year colleges or universities in 1999. (See appendix table 6-10.)

Nondoctoral scientists and engineers

Among those employed in S&E occupations in 1999, 85 percent of women and 86 percent of men had either a bachelor's or master's degree as their highest degree. (See appendix table 6-1.) The occupations of these nondoctoral scientists and engineers, as is true for all of those employed in S&E, differ by sex, with women constituting the majority of people in some S&E occupations, and men the majority in others. For example, in 1999, almost two-thirds of all social and related scientists whose highest degree was a baccalaureate were women. Men, on the other hand, constituted 90 percent of the engineers and 73 percent of the physical scientists and computer/mathematical scientists whose highest degree was a baccalaureate.

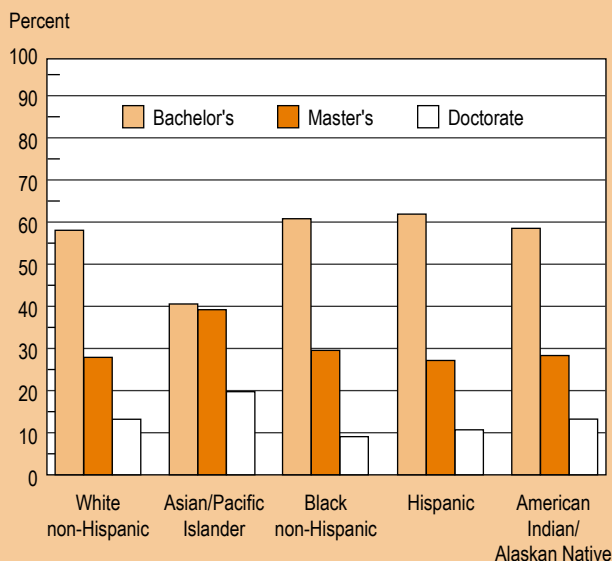
Asians employed in S&E occupations are less likely than members of other racial/ethnic groups to have a bachelor's or master's degree as their highest degree conferred: 80 percent of employed Asian scientists and engineers had either a bachelor's or master's degree as their highest degree in 1999, compared with between 86 and 90 percent of all other racial/ethnic groups. Higher proportions of Asian scientists and engineers than of other racial/ethnic groups held doctoral degrees. (See figure 6-2 and appendix table 6-1.) Similar percentages of those in S&E occupations with and without disabilities (84 and 86 percent, respectively, in 1999) have a bachelor's or master's as their highest degree. (See appendix table 6-3.)

Professional development activities

Employed scientists and engineers engage in many different professional development activities. These include attending meetings, participating in professional societies or associations, and attending work-related workshops or seminars.

Approximately half of all employed scientists and engineers, as defined by education or occupation, in 1999 attended professional meetings in the previous year. (See text table 6-4.) Men differed little from women, and scientists and engineers with disabilities differed little from those without disabilities, in attendance at professional meetings. The various racial/ethnic groups did differ somewhat, however. For example, Asians were less likely than members of other racial/ethnic groups to attend professional meetings, although this difference is likely field related; Hispanic engineers were more likely than white engineers to attend

Figure 6-2
Percentage distribution by highest degree of those employed in S&E occupations within each racial/ethnic group: 1999



SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

professional meetings; and black physical scientists were less likely than most others in their profession to attend professional meetings.

Slightly more than half of employed scientists and engineers in 1999 reported belonging to a national or international professional society or association. (See text table 6-5.) Among life and physical scientists, women were less likely than men to be members of a professional society or association. Among computer/math scientists and life and related scientists, blacks were more likely than members of most other racial/ethnic groups to belong to professional societies; and, among social and related scientists, both blacks and whites were more likely than members of most other racial/ethnic groups to belong to professional societies. There were few differences by disability status in professional society membership.

Sixty-seven percent of those employed in S&E occupations in 1999 attended work-related training in the previous year. (See figure 6-3.) Of those attending such training, 87 percent pursued training in their occupational field; 26 percent pursued management training; and 22 percent pursued general professional training, such as public speaking or business writing. (See appendix table 6-11.) Among those attending training, men were more likely than women to attend management training. There were relatively few differences by race/ethnicity or disability status in this type of training. Regardless of sex, race/ethnicity, or

Text table 6-4

Employed scientists and engineers who had attended professional meetings in the previous year, by sex, race/ethnicity, disability status, and broad occupation: 1999
 (Percent)

Sex, race/ethnicity, and disability status	Total	Occupation					
		Computer/mathematical scientist	Life and related scientist	Physical and related scientist	Social and related scientist	Engineer	Non-S&E
Total.....	55.8	41.3	72.0	65.3	76.4	49.9	57.1
Male.....	56.2	41.3	74.3	68.4	76.7	49.8	58.5
Female.....	55.2	41.2	67.9	54.8	76.2	50.9	54.9
White, non-Hispanic.....	56.5	41.3	72.3	65.8	77.1	49.4	57.8
Asian/Pacific Islander.....	48.7	40.7	69.9	65.5	66.0	50.2	47.5
Black, non-Hispanic.....	55.4	41.5	74.8	45.7	69.6	52.6	56.6
Hispanic.....	55.9	44.7	66.7	66.2	78.6	58.3	55.1
American Indian/Alaskan Native.....	58.3	38.9	85.5	86.3	84.6	56.1	56.4
Without disabilities.....	55.9	41.3	74.3	68.4	76.7	49.8	57.2
With disabilities.....	54.2	40.4	68.3	64.8	79.5	49.2	54.8

NOTES: "Scientists and engineers" include all people holding a bachelor's degree or higher in an S&E field plus people holding a non-S&E bachelor's degree or higher who were employed in an S&E occupation in 1993. "Professional meetings" include professional society/race/ethnicity not shown separately.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

Text table 6-5

Employed scientists and engineers holding membership in professional societies or associations, by sex, race/ethnicity, disability status, and broad occupation: 1999

(Percent)

Sex, race/ethnicity, and disability status	Total	Occupation					
		Computer/mathematical scientist	Life and related scientist	Physical and related scientist	Social and related scientist	Engineer	Non-S&E
Total.....	53.9	35.6	71.3	69.9	76.9	54.4	54.1
Male.....	55.0	36.0	74.9	72.0	78.8	54.6	56.0
Female.....	51.8	34.4	65.0	63.0	75.3	52.0	51.3
White, non-Hispanic.....	54.4	35.2	71.5	69.4	77.7	54.5	54.6
Asian/Pacific Islander.....	47.9	34.5	70.4	75.1	70.2	52.4	46.6
Black, non-Hispanic.....	55.7	45.0	78.2	66.2	77.3	57.9	55.4
Hispanic.....	52.6	37.0	65.6	70.3	69.0	56.1	52.2
American Indian/Alaskan Native.....	52.0	45.9	67.5	82.0	67.2	56.8	48.8
Without disabilities.....	54.0	35.6	71.2	70.1	76.8	54.6	54.2
With disabilities.....	52.7	35.4	73.6	67.4	79.4	51.3	52.8

NOTES: "Scientists and engineers" include all people holding a bachelor's degree or higher in an S&E field plus people holding a non-S&E bachelor's degree or higher who were employed in an S&E occupation in 1993. Details may not add to totals because of rounding. Total includes "other" race/ethnicity not shown separately.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

disability status, the top two primary reasons cited by employed scientists and engineers, in S&E and non-S&E occupations, for engaging in work-related training activities were (1) to gain further skills in their occupational field or (2) because it is required or expected by their employers. (See text table 6-6 and appendix table 6-12.)

Salaries of employed scientists and engineers

Many factors explain the various differences that exist between the annual salaries of men and women, among racial/ethnic groups, and between persons with and without disabilities employed full time in S&E occupations. Three of the most important of these factors are length of experience, occupation, and highest degree level. Other reports (NSF/SRS 1996 and NSF/SRS 1999) provide more detailed explanations of the variety of factors influencing salaries for men and women.

Women

Women employed full time in S&E occupations earn less than men on average, but these salary differentials are due primarily to differences in age, length of experience, occupation, and highest degree attained. Female scientists and engineers are younger and have less experience, on average, than male scientists and engineers and are less likely than men to be computer scientists or engineers—

occupations that command higher salaries. The 1999 overall median salary for those employed full time in S&E occupations was \$50,300 for women and \$64,000 for men. Within occupations and by degree levels and for younger age categories, the median salaries of men and women are generally more similar. (See appendix table 6-13.) For example, in 1999, among engineers aged 29 or younger with a bachelor's degree, the median salary was \$46,000 for men and \$45,000 for women.

Minorities

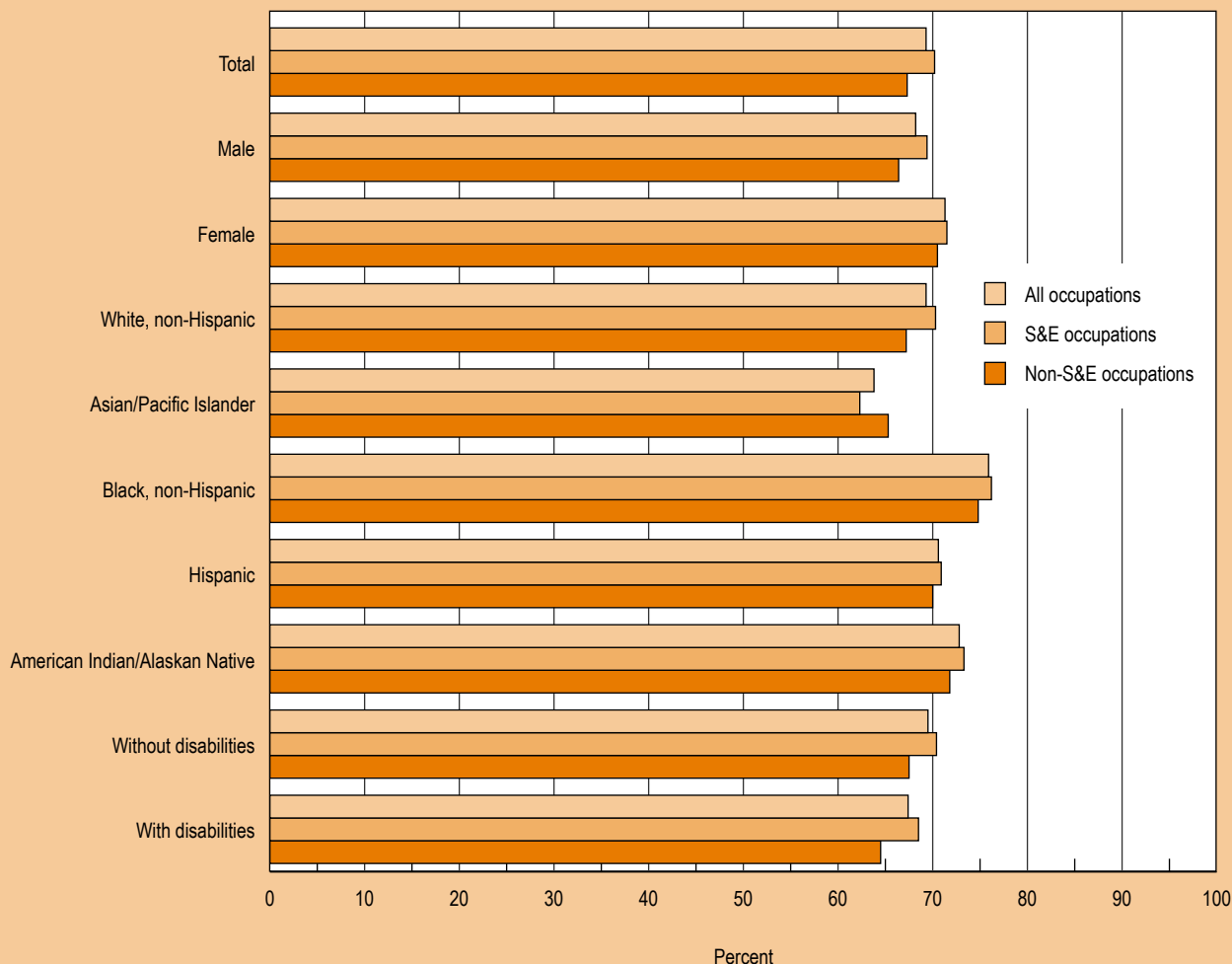
Salaries for those in S&E occupations differ across racial/ethnic groups. Among all who were employed in S&E occupations, the median salaries by racial/ethnic group in 1999 were \$63,000 for Asians, \$61,000 for whites, \$55,000 for Hispanics, \$53,000 for blacks, and \$50,000 for American Indians. Within S&E occupations and within age and highest degree categories, median salaries are often similar across racial/ethnic groups. (See appendix table 6-14.)

Minority women

Median annual salaries of females employed in S&E occupations of all racial/ethnic groups are generally lower than those of male scientists and engineers. (See appendix table 6-15.) Differences in highest degree (as well as other factors; see NSF/SRS 1996) are also likely to influence salaries; however, small sample size did not permit adjustment by highest degree for this analysis.

Figure 6-3

Percentage of employed scientists and engineers engaged in work-related training, by type of occupation, sex, race/ethnicity, and disability status: 1999



NOTE: "Scientists and engineers" include all people holding a bachelor's degree or higher in an S&E field plus people holding a non-S&E bachelor's degree or higher who were employed in an S&E occupation in 1993.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

Persons with disabilities

Median salaries of scientists and engineers with disabilities are similar to those for scientists and engineers without disabilities. For example, in 1999, among all those employed full time in S&E occupations, the median salary was \$60,000 for those without disabilities and \$61,600 for those with disabilities. Salaries also differ little within occupations and age groups. For example, the median salary for 30- to 39-year-old computer scientists with a bachelor's degree is \$60,000 for those with disabilities and \$61,000 for those without disabilities. (See appendix table 6-16.)

Initial labor force experiences of recent graduates

By 1999, the vast majority of the approximately 950,000 individuals who had earned bachelor's, master's, or doctoral degrees in S&E in 1996/97 and 1997/98 from U.S. colleges and universities and who were residing in the United States had entered the labor force. This section focuses on their initial labor force experiences.

Text table 6-6

Primary reason cited by scientists and engineers for attending work-related training, by sex, race/ethnicity, and disability status: 1999

(Percent of those attending)

Sex, race/ethnicity, and disability status	To gain further skills or knowledge in occupational field	Required/expected by employer	For licensure/certification
Total.....	62.1	12.2	10.2
Male.....	62.5	12.5	10.0
Female.....	61.4	11.8	10.6
White, non-Hispanic.....	62.6	12.3	10.6
Asian/Pacific Islander.....	63.5	10.6	6.7
Black, non-Hispanic.....	55.9	13.7	9.2
Hispanic.....	59.4	12.2	9.5
American Indian/ Alaskan Native.....	57.1	14.0	9.1
Without disabilities.....	62.2	12.1	10.2
With disabilities.....	61.0	14.2	9.9

NOTES: "Scientists and engineers" include all people holding a bachelor's degree or higher in an S&E field plus people holding a non-S&E bachelor's degree or higher who were employed in an S&E occupation in 1993. Details may not add to totals because of rounding. Total includes "other race" not broken out separately.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

Recent bachelor's degree recipients

Among the bachelor's degree earners, approximately 22 percent were enrolled as full-time students in 1999, another 22 percent were employed in S&E occupations, and 51 percent were employed in non-S&E occupations. (See appendix table 6-17.) Although men and women accounted for similar numbers of S&E bachelor's degree recipients, men were twice as likely as women to be employed in a science or engineering occupation.⁹ Much of the difference is accounted for by differences in field. Women are far more likely than men to have a bachelor's degree in the social and related sciences, and a much smaller percentage of those with such degrees are employed in S&E occupations.

Among recent S&E bachelor's degree recipients, blacks are the least likely of members of all racial/ethnic groups to be employed in a science or engineering occupation; Asians are the most likely. At least some of these racial/ethnic differences in employment status are field related. For example, blacks are more likely than members of other

racial/ethnic groups to have earned their baccalaureate in the social and related sciences—fields in which a small percentage of recent graduates are employed in S&E occupations, and Asians are more likely than members of other racial/ethnic groups to have earned their bachelor's degree in engineering—a field in which a large percentage of recent graduates are employed in S&E occupations. Overall, blacks and Hispanics are as likely as whites to be full-time students after receiving a bachelor's degree.

Although persons with disabilities represent a small percentage of the total bachelor's degree awards in S&E, they are as likely as persons without disabilities to be full-time students, employed in an S&E occupation, or employed in a non-S&E occupation.

Recent master's degree recipients

Among S&E master's degree recipients in 1996/97 and 1997/98, approximately 20 percent were enrolled as full-time students in 1999, 46 percent were employed in an S&E occupation, and 29 percent were employed in a non-S&E occupation. (See appendix table 6-18.) Although men and women made up relatively equal proportions of the master's degree recipients in science fields as a whole, men represented almost 60 percent of those employed in S&E occupations in 1999, and women represented just over 60 percent of those employed in non-S&E occupations. As with bachelor's degrees, the disproportionate number of women with master's degrees in the social and related sciences accounts for a large part of this difference. Among all S&E master's degree recipients, Asians were least likely of members of any racial/ethnic group to be employed in a non-S&E occupation in 1999. Blacks were the least likely to be employed in an S&E occupation and the most likely to be employed in a non-S&E occupation. Persons with disabilities represent a small percentage of the total recipients of master's degrees in S&E, but were as likely as persons without disabilities to be employed in a science or engineering occupation.

Recent doctoral degree recipients

Among doctorate earners in S&E in 1996/97 and 1997/98, 26 percent were working in postdoctoral positions, and another 65 percent were working in full-time jobs in 1999. (See appendix table 6-19.) Women were more likely than men to have postdoctoral positions, to be employed part time, and to be out of the labor force (i.e., not employed and not seeking work). Asians were more likely than other racial/ethnic groups to be in postdoctoral positions; this was especially true for the life sciences, where 60 percent of Asians held postdoctoral positions. Recent doctorate

⁹See Rayman and Brett (1995) for factors related to women's persistence in science after graduation.

recipients with disabilities were less likely than those without to have postdoctoral positions; they were more likely to have full-time jobs.

Approximately 88 percent of the 1996/97 and 1997/98 doctorate earners indicated that between the time they completed their doctorate and the time of the survey (1999) they had either sought or held a “career path” job, defined in the survey as one that helps an individual further his or her career plans in a field in which he or she wants to make a career.

When asked to indicate the extent to which there were limitations imposed on their search for a career path job, the women were more likely than the men to report that their job search was limited “somewhat” or “a great deal” by their spouse’s career or employment and by their own desire not to relocate or move to the place of job. (See appendix table 6-20.) Women were no more likely than men to report that family responsibilities limited their career path job search, however.

Racial/ethnic differences in career path limitations were also evident. Black and Hispanic doctorate earners were more likely than members of other racial/ethnic groups to report that debt burden from undergraduate or graduate degrees limited their career path job search. Asian doctorate earners were more likely than members of other racial/ethnic groups to report that their job search was limited because a suitable job was not available. Recent doctorate recipients with and without disabilities reported roughly similar limitations on their career path job search.

A demographic profile: Age and family characteristics

Women

Differences in age are related to many of the differences in employment characteristics between male and female scientists and engineers (defined by either degree or occupation). Women with an S&E degree or occupation are younger, on average, than men: 44 percent of the women and 32 percent of the men with an S&E degree or occupation in 1999 were less than 40 years old. (See appendix table 6-21.)

Women with an S&E degree or in an S&E occupation are less likely than men to be married: in 1999, 62 percent of these women were married, compared with 75 percent of their male counterparts. (See appendix table 6-21.) Among those who are married, women are more likely than men to face the potential difficulty of accommodating dual careers. Women are almost twice as likely as men to have a spouse working full time: 82 percent of the married women and 43 percent of the married men had a spouse working

full time in 1999. (See figure 6-4 and appendix table 6-21.) Only 13 percent of the married women, but 38 percent of the married men, had a spouse who did not work.

Among those with an S&E degree or occupation, married women are more likely than married men to have a spouse whose job requires technical expertise at the bachelor’s degree level or above in engineering, computer science, math, or natural science. (See appendix table 6-21.) Thirty-eight percent of women and 18 percent of men had spouses whose jobs required expertise in these fields. Men and women with an S&E degree or occupation do not differ with regard to having children living at home.

Minorities

Reflecting continuing changes in the rate of participation of minorities in S&E education, the age distributions of scientists and engineers (defined by either degree or occupation) across racial/ethnic groups differ. About 34 percent of whites with an S&E degree or occupation were younger than age 40 in 1999, compared with between 38 and 52 percent of their Asian, black, Hispanic, or American Indian counterparts. (See appendix table 6-22.)

Figure 6-4
Spouse’s employment status of married scientists and engineers, by sex: 1999



NOTE: “Scientists and engineers” include all people holding a bachelor’s degree or higher in an S&E field plus people holding a non-S&E bachelor’s degree or higher who were employed in an S&E occupation in 1993.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

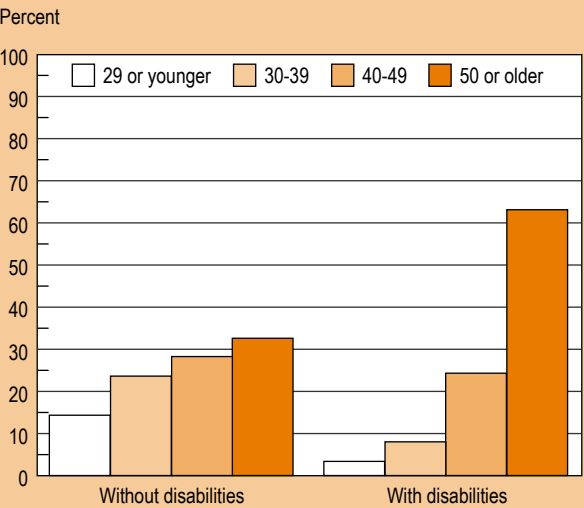
Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

Persons with disabilities

Scientists and engineers (as defined by degree or occupation) with disabilities are older, on average, than those without disabilities. (See figure 6-5.) Only 12 percent of

scientists and engineers with disabilities were younger than age 40 in 1999, compared with 38 percent of those without disabilities. Conversely, 64 percent of those with disabilities and 33 percent of those without were age 50 or older. (See appendix table 6-23.)

Figure 6-5
Age distribution of scientists and engineers, by disability status: 1999



NOTE: "Scientists and engineers" include all people holding a bachelor's degree or higher in an S&E field plus people holding a non-S&E bachelor's degree or higher who were employed in an S&E occupation in 1993.

SOURCE: National Science Foundation, Division of Science Resources Statistics, Scientists and Engineers Statistical Data System (SESTAT).

Women, Minorities, and Persons With Disabilities in Science and Engineering: 2002

References

National Science Foundation, Division of Science Resources Studies (NSF/SRS). 1996. *Women, Minorities, and Persons With Disabilities in Science and Engineering: 1996*. NSF 96-311. Arlington, VA.

———. 1999. *How Large Is the Gap in Salaries of Male and Female Engineers?* NSF 99-352. Arlington, VA.

———. 2000. *Women, Minorities, and Persons With Disabilities in Science and Engineering: 2000*. NSF 00-327. Arlington, VA.

———. 2001. *Doubling Up: A Profile of U.S. Scientists and Engineers Who Hold Second Jobs*. NSF 01-322. Arlington, VA.

Rayman, P., and B. Brett. 1995. Women science majors: What makes a difference in persistence after graduation? *Journal of Higher Education* 66(4):388-414.